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(71)Applicant : MITSUBISHI CHEMICAL CORP

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(72)Inventor : URANO TOSHIYOSHI

HINO ETSUKO

SASAKI MITSURU

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(54) POSITIVE IMAGE FORMING METHOD

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a positive image forming method having excellent contrast of an image part with a non-image part, sufficiently holding a survival film rate of the image part and having excellent scratch resistance.

SOLUTION: A positive image is formed on a base material after exposure, by developing an image forming material having a positive photosensitive composition layer which contains novolak resin and a light and heat converting material to convert the light of a light source for image exposure to heat by absorbing it, and does not contain a thermal decomposition material decomposed by heat produced when the light and heat converting material absorbs the light of the light source for image exposure, by alkali liquid developer containing ampholytic surface active agent.

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CLAIMS

[Claim(s)]

[Claim 1] The light-and-heat conversion matter which absorbs the light of novolak resin and the image exposure light source, and is changed into heat on a base material is contained. The image formation ingredient which has the positive type photosensitivity constituent layer which does not contain the pyrolysis nature matter disassembled according to an operation of the heat which this light-and-heat conversion matter absorbs the light of the image exposure light source, and generates The positive image formation approach characterized by developing negatives with the alkali developer which contains an amphoteric surface active agent after exposure, and forming a positive image.

[Claim 2] The positive image formation approach according to claim 1 that an amphoteric surface active agent is a betaine mold compound.

[Claim 3] The positive image formation approach according to claim 1 or 2 that the concentration in the alkali developer of an amphoteric surface active agent is 0.0001 - 20 % of the weight.

[Claim 4] The positive image formation approach according to claim 1 to 3 that an alkali developer is characterized by containing the silicate of alkali metal.

[Claim 5] The positive image formation approach according to claim 1 to 4 that the silicon content in an alkali developer is 0.5 - 5 % of the weight as a silicon dioxide, and the ratios of the mol concentration of a silicon dioxide to the mol concentration of alkali metal are 0.1-1.5.

[Claim 6] The positive image formation approach according to claim 1 to 5 that the light-and-heat conversion matter is cyanine dye which has near infrared ray absorbing power.

[Claim 7] The positive image formation approach according to claim 6 that cyanine dye has a boron anion as a counter ion.

[Claim 8] The positive image formation approach according to claim 1 to 7 that a positive type photosensitivity constituent layer contains a dissolution retardant further.

[Claim 9] The positive image formation approach according to claim 8 that a dissolution retardant is acid color-enhancing coloring matter which has a lactone frame.

[Claim 10] The positive image formation approach characterized by developing the image formation ingredient which has the positive type photosensitivity constituent layer which contains the light-and-heat conversion matter which absorbs the light of novolak resin and the image exposure light source, and is changed into heat, and does not contain an onium salt, diazonium salt, and a quinone diazide compound with the alkali developer which contains an amphoteric surface active agent after exposure, and forming a positive image on a base material.

[Claim 11] The positive image formation approach characterized by containing the light-and-heat conversion matter which absorbs the light of novolak resin and the image exposure light source, and is changed into heat, developing the image formation ingredient which has the positive type photosensitivity constituent layer which does not have susceptibility substantially

in ultraviolet radiation with the alkali developer which contains an amphoteric surface active agent after exposure, and forming a positive image on a base material.

[Claim 12] the positive image formation approach which characterize by to contain the light and heat conversion matter which absorb the light of novolak resin and the image exposure light source , and change into a heat on a base material , to develop the image formation ingredient which have the positive type photosensitivity constituent layer which do not produce a substantial significant difference in the solubility over an alkali developer by leave it under the 400 - lux white fluorescent lamp of optical reinforcement for 10 hours with the alkali developer which contain an amphoteric surface active agent the exposure back , and to form a positive image

[Claim 13] The light-and-heat conversion matter which absorbs the light of novolak resin and the image exposure light source, and is changed into heat on a base material is contained. The image formation ingredient which has the positive type photosensitivity constituent layer which does not contain the pyrolysis nature matter disassembled according to an operation of the heat which this light-and-heat conversion matter absorbs the light of the image exposure light source, and generates The positive image formation approach characterized by developing negatives with the alkali developer which contains an amphoteric surface active agent after exposure by 650-1300nm laser light, and forming a positive image.

[Claim 14] The positive image formation approach given in either of claims 1, 10, 11, 12, or 13 whose base materials are the aluminum for the lithography versions or the aluminium alloy base material with which graining processing and anodizing were performed.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention The photosensitive lithography version, the proof for simple proofreading printing, a patchboard and copper etching resist for gravures, The resist for color filters used for flat display manufacture, It is related with the image formation approach using the positive type image formation ingredient which consists of a photosensitive constituent containing the light-and-heat [mainly as opposed to the light of a near infrared region] conversion matter used [photoresist / for LSI manufacture]. Especially, it is related with the image formation approach using the suitable positive type image formation ingredient for the direct platemaking by semiconductor laser, an YAG laser, etc.

[0002]

[Description of the Prior Art] Conventionally, the printing version which has the sensitization layer which contains alkali fusibility resin and a quinone diazide compound on a base material as a photosensitive lithography version of the positive type which can form a positive image is known by developing negatives after irradiating ultraviolet radiation using an alkali water solution through a silver salt mask film manuscript. While the solubility over the alkali developer of alkali fusibility resin is controlled by containing a quinone diazide compound, the above-mentioned dissolution depressor effect is lost and the sensitization layer which has this quinone diazide compound is considered to have the property whose solubility over the alkali developer of the above-mentioned sensitization layer improves rather, when a quinone diazide compound decomposes in photochemistry by the exposure of ultraviolet radiation and generates an indene carboxylic acid. That is, the positive image formation mechanism of the sensitization layer containing a quinone diazide compound originates in a difference arising in solubility in the exposure section and the unexposed section with the chemical change like the above.

[0003] However, since the conventional positive type photosensitivity lithography version with which a sensitization layer contains a quinone diazide compound had susceptibility in ultraviolet radiation, it had the fault which must be dealt with under yellow light. Moreover, it is known using the alkaline water solution which has alkali-metal ion, such as a specific silicate, a sodium carbonate, and a sodium hydroxide, as a developer of this positive type photosensitivity lithography version, that a surface active agent can be used as a kind of the various additives of this developer, and that it is effective in development latitude improving if an amphoteric surface active agent is used further. However, while promoting the solubility of the exposure section by making a developer contain an amphoteric surface active agent in the case of this kind of positive type photosensitivity lithography version, the solubility of the unexposed section falls according to an operation of the quinone diazide compound like the above-mentioned, it is thought that the above-mentioned effectiveness is attained, and an operation of this surfactant is indicated about the sensitization layer accompanied by a

chemical change therefore to image formation.

[0004] On the other hand, the sensitization or the sensible-heat direct platemaking system which forms a direct resist image attracts attention from laser light or a thermal head with the advance of a computer image processing technique, without performing the output from digital image information to a silver salt mask film. Especially as for the laser sensitization direct platemaking system of high resolution using semiconductor laser, an YAG laser, etc. of high power, the implementation was strongly desired from Men, such as ambient light at the time of a miniaturization and a platemaking activity, and plate cost.

[0005] Conventionally as the image formation approach using laser sensitization or a sensible heat The approach of producing the lithography version etc. is learned by the approach list which uses sublimation imprint coloring matter and forms a color-material image, and it sets to the latter. How to use the crosslinking reaction of a diazo compound and produce the lithography version concretely for example, reference, such as JP,50-15603,A, JP,52-151024,A, JP,60-12939,B, JP,61-21831,B, JP,2-51732,B, and JP,3-34051,B each official report and a U.S. Pat. No. 3664737 specification, -- The approach (for example, reference, such as JP,50-102401,A and JP,50-102403,A each official report.) of using the decomposition reaction of a nitrocellulose and producing the lithography version etc. is learned.

[0006] In recent years, the technique which combined long wavelength beam-of-light absorption coloring matter with the photoresist of a chemistry magnification mold came to appear here and there. for example, as a technique which the negative-mold photosensitivity ingredient which combined the photo-oxide generating agent and the binder with specific squarylium system coloring matter is indicated by JP,6-43633,A, and is similar to this In JP,7-20629,A, infrared absorption coloring matter, insidious Broensted acid, The approach of exposing the photosensitive constituent layer containing resol resin and novolak resin in the shape of an image with semiconductor laser etc., and producing the lithography version both for POJINEGA to JP,7-271029,A It replaces with said insidious Broensted acid, and the approach using s-triazine compound is indicated. However, according to this invention person's etc. examination, these Prior arts have the fault which is not necessarily stable as for the image obtained according to the processing condition in the negative-mold photosensitivity constituent which requires heat-treatment after exposure.

[0007] On the other hand, as a sensitive material of a positive type, to JP,7-285275,A A binder, the matter which absorbs light and generates heat, and the matter to which the solubility of this binder is substantially reduced in the condition of being pyrolysis nature and not decomposing The positive type photosensitivity printing version which comes to prepare a sensitization layer including (calling the pyrolysis nature matter hereafter) is indicated, and image formation of this printing version is developed and carried out with an alkali developer, It is indicated that surface active agents, such as an anion system, the Nonion system, and an amphoteric surface active agent, an organic solvent and a reducing agent, an organic carboxylic acid, a defoaming agent, and a water softener can be added to a developer if needed. However, the pyrolysis nature compounds contained in the sensitization layer of the printing version given in this official report are an onium salt, diazonium salt, and a quinone diazide compound, and each of these is widely known as what has susceptibility in the light of an ultraviolet region, and has a fault inferior to the handling nature (safe light nature is called hereafter) under a white LGT. In addition, the printing version of this official report forms an image with the chemical change (chemical change by the pyrolysis) in the exposure section.

[0008] Moreover, invention about the compound which reduces the solubility over the alkali solution of the polyurethane, polyester or polyamide resin which has a certain kind of acrylic-acid system resin or a hydrophilic radical, and this resin to JP,10-3165,A, and the photosensitive constituent containing infrared-absorption coloring matter is indicated, and an organic solvent, the water-soluble sulfite, the solubilizing agent, the anion system surfactant,

the amphoteric surface active agent, etc. are indicated as an addition component used for an alkali developer as occasion demands. However, about the additive of a developer in case resin is novolak resin, it is not teaching at all. Moreover, the photosensitive constituent given in this official report specifically contains the diphenyliodonium salt in the photosensitive constituent, and is presumed to be that in which image formation is carried out by the chemical change of the pyrolysis nature matter like invention indicated by said JP,7-285275,A.

[0009] Moreover, the pattern formation approach using the POJIREJISUTO material and it which it heats [it] to JP,9-43847,A by infrared exposure, and change the crystallinity of sensitization material to it contains the compound which inhibits the aquosity development nature of the polymer in which aquosity development is possible, and this polymer to WO 97/39894, aquosity development nature improves with heating, and the positive setup-of-tooling product of the heat sensitivity whose aquosity development nature does not improve is indicated in UV irradiation. Since the sensitive material of the positive type indicated by these does not contain in ultraviolet radiation the compound which has susceptibility, it has the advantage which has safe light nature. Moreover, the sensitive material of this positive type belongs to technically different criteria from the above-mentioned positive type photosensitivity lithography version excluding the matter which produces a chemical change substantially by exposure like the above-mentioned positive type photosensitivity Taira version mark lithographic plate.

[0010] However, in these positive type photosensitivity constituent, the contrast of the image section and the non-image section was inadequate, consequently the non-image section was not fully removed, the remaining rate of membrane of the image section was not fully held, and, for the reason, it had a practical fault, like the width of face of development conditions is also narrow. For example, although it is suggested to WO 97/39894 about a positive setup-of-tooling product that develop the positive type printing version with the developer containing a surface active agent, a chelating agent, an organic solvent, an alkali component, etc., and a positive image forms, having specifically formed the image by using specific metasilicate, 5 hydrate water solutions, etc. as a developer is shown. When the sensitive material like a publication was developed with an alkali developer to JP,9-43847,A and WO 97/39894 as a result of our examination, the remaining rate of membrane of the image section (non-exposed area) was not enough, and it turned out that it has the fault which is further inferior in scratch-proof nature. If the problem to which printing-proof nature and ink impression nature will fall if a remaining rate of membrane is inferior is produced and scratch-proof nature is inferior when sensitive material is especially used as a printing version, the problem to which printing image repeatability falls will arise, and it will become a problem practically as a printing version.

[0011]

[Problem(s) to be Solved by the Invention] The pyrolysis nature compound disassembled with the heat which it is indifferent of this invention in view of the above-mentioned conventional technique, and the light-and-heat conversion matter absorbs the light of the image exposure light source, and generates On (the pyrolysis nature matter is only called hereafter) and a concrete target, an onium salt, diazonium salt, Or while it excels in the contrast of the image section (unexposed section) and the non-image section (exposure section) on the assumption that the sensitive material which has the sensitization layer which does not contain a quinone diazide compound, and the remaining rate of membrane of the image section is also fully held, it aims at offering the positive image formation approach excellent also in scratch-proof nature.

[0012]

[Means for Solving the Problem] as a result of inquire wholeheartedly that said technical problem should be solve on the assumption that the positive type image formation approach of have the positive type photosensitivity constituent layer which contain the light and heat

conversion matter which absorb the light of novolak resin and the image exposure light source , and be change into heat , and do not contain a pyrolysis nature matter on a base material , this invention person etc. find out that said purpose can be attain , and complete this invention by develop a negatives using the alkali developer containing an amphoteric surface active agent . that is , this invention make a summary the positive image formation approach characterize by to contain the light and heat conversion matter which absorb the light of novolak resin and the image exposure light source , and change into a heat on a base material , to develop the image formation ingredient which have the positive type photosensitivity constituent layer which do not contain the matter which disassemble according to an operation of the heat which absorb the light of the image exposure light source and be generate with the alkali developer which contain an amphoteric surface active agent after exposure , and to form a positive image .

[0013] another summary of this invention consist in the positive image formation approach characterize by to develop the image formation ingredient which have the positive type photosensitivity constituent layer which contain the light and heat conversion matter which absorb the light of novolak resin and the image exposure light source , and be change into heat , and do not contain an onium salt , diazonium salt , and a quinone diazide compound with the alkali developer which contain an amphoteric surface active agent after exposure , and to form a positive image on a base material . moreover , another summary of this invention consist in the positive image formation approach characterize by contain the light and heat conversion matter which absorb the light of novolak resin and the image exposure light source , and be change into a heat , develop the image formation ingredient which have the positive type photosensitivity constituent layer which do not have susceptibility substantially in ultraviolet radiation with the alkali developer which contain an amphoteric surface active agent after exposure , and form a positive image on a base material .

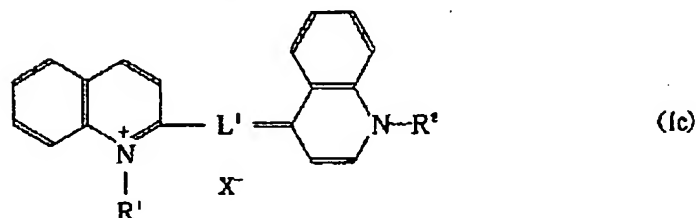
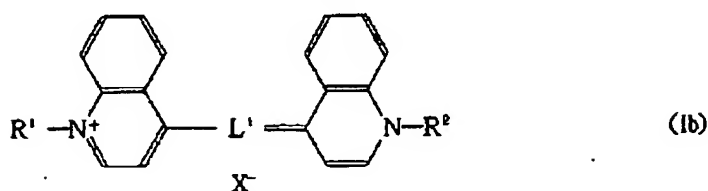
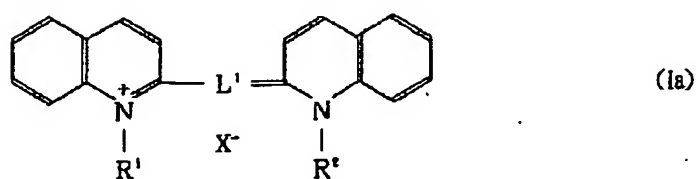
[0014]

[Embodiment of the Invention] In this invention, the positive type photosensitivity constituent which constitutes a positive type photosensitivity constituent layer uses as an indispensable component the light-and-heat conversion matter of the image exposure light source which mainly absorbs the light of a near infrared region and is changed into heat. Although it will not be limited especially if it is the compound which can change the absorbed light into heat as this light-and-heat conversion matter here, especially the light absorption coloring matter that has an absorption band is [650-1300nm of wavelength regions] preferably effective in a 700-1300nm part or all. As these light absorption coloring matter, a nitrogen atom, an oxygen atom, or a sulfur atom is poly methine (- CH=) n. It has the combined frame and resonating structure can be taken. The so-called cyanine system coloring matter of a wide sense is mentioned as a typical thing. Specifically For example, a quinoline system (the so-called cyanine system), the Indore system (the so-called India cyanine system), A benzothiazole system (the so-called thio cyanine system), an imino cyclohexadiene system (the so-called poly methine system), a pyrylium system, a thia pyrylium system, a squarylium system, a crocodile NIUMU system, an AZURENIUMU system, etc. are mentioned. In inside A quinoline system, the Indore system, a benzothiazole system, an imino cyclohexadiene system, a pyrylium system, or a thia pyrylium system is desirable.

[0015] It sets to this invention and is the following general formula (Ia) especially as quinoline system coloring matter in said cyanine system coloring matter. What is expressed with (Ib) or (Ic) is desirable.

[0016]

[Formula 1]



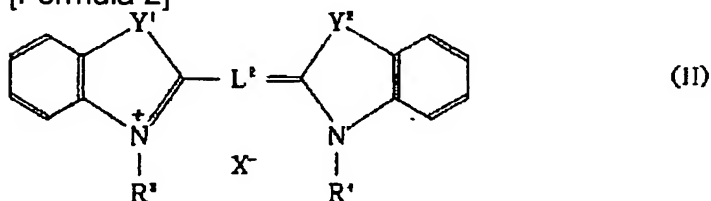
[0017] R1 and R2 become independent respectively among [a formula (Ia), (Ib), and (Ic)]. The alkyl group which may have the substituent, the alkenyl radical which may have the substituent, The alkynyl group which may have the substituent, or the phenyl group which may have the substituent is shown. L1 Tori who may have the substituent, PENTA, or a hepta-methine group is shown. Two substituents on this PENTA or a hepta-methine group may connect mutually, the cycloalkene ring of carbon numbers 5-7 may be formed, the quinoline ring may have the substituent, and two substituents which adjoin in that case may connect it mutually, and it may form the condensation benzene ring. X - An opposite anion is shown.]

[0018] here -- R1 in a formula (Ia), (Ib), and (Ic) And R2 as a substituent which can be set, an alkoxy group, a phenoxy group, a hydroxy group, or a phenyl group mentions -- having -- L1 As a substituent which can be set, an alkyl group, the amino group, or a halogen atom is mentioned, and an alkyl group, an alkoxy group, a nitro group, or a halogen atom is mentioned as a substituent in a quinoline ring.

[0019] Moreover, especially as the Indore system and benzothiazole system coloring matter, what is expressed with the following general formula (II) is desirable.

[0020]

[Formula 2]



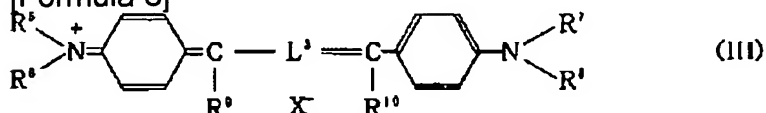
[0021] Y1 and Y2 show respectively independently a dialkyl methylene group or a sulfur atom among [type (II)], and R3 and R4 become independent respectively. The alkyl group which may have the substituent, the alkenyl radical which may have the substituent, The alkynyl group which may have the substituent, or the phenyl group which may have the substituent is shown. L2 Tori who may have the substituent, PENTA, or a hepta-methine group is shown. Two substituents on this PENTA or a hepta-methine group may connect mutually, the cycloalkene ring of carbon numbers 5-7 may be formed, the condensation benzene ring may have the substituent, and two substituents which adjoin in that case may connect it mutually, and it may form the condensation benzene ring. X- shows an opposite anion.]

[0022] Here, it is R3 in a formula (II). And R4 As a substituent which can be set, an alkoxy group, a phenoxy group, a hydroxy group, or a phenyl group is mentioned, and it is L2. As a substituent which can be set, an alkyl group, the amino group, or a halogen atom is mentioned, and an alkyl group, an alkoxy group, a nitro group, or a halogen atom is mentioned as a substituent in the benzene ring.

[0023] Moreover, especially as imino cyclohexadiene system coloring matter, it is the following general formula (III). What is expressed is desirable.

[0024]

[Formula 3]



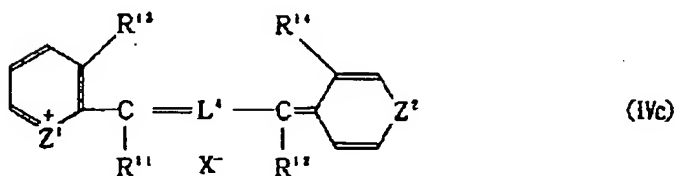
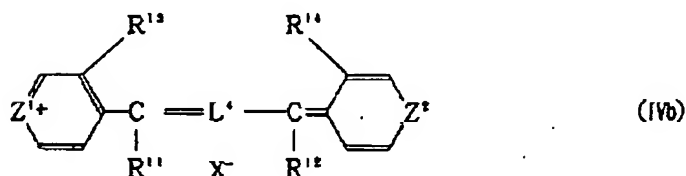
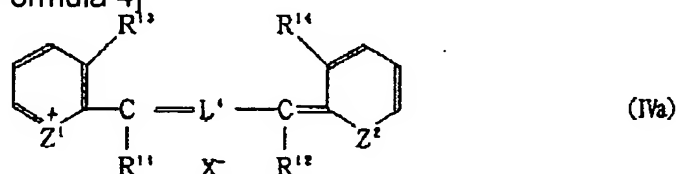
[0025] R5, R6, R7, and R8 become independent respectively among [type (III)]. An alkyl group is shown and it is R9. And the aryl group in which R10 may have the substituent respectively independently, A furil radical or a thienyl group is shown and it is L3. The monochrome and Tori who may have the substituent, or a pentamethine radical is shown, and two substituents on this TORI or a pentamethine radical may connect mutually, and may form the cycloalkene ring of carbon numbers 5-7. X - An opposite anion is shown.]

[0026] Here, it is a formula (III). Inner R9 As R10, and specifically A phenyl group, 1-naphthyl group, 2-naphthyl group, 2-furil radical, 3-furil radical, 2-thienyl group, 3-thienyl group, etc. are mentioned. As those substituents An alkyl group, an alkoxy group, a dialkylamino radical, a hydroxy group, or a halogen atom is mentioned, and it is L3. As a substituent which can be set, an alkyl group, the amino group, or a halogen atom is mentioned.

[0027] moreover -- as a pyrylium system and thia pyrylium system coloring matter -- especially -- the following general formula (IVa) -- or (IVb) (IVc) What is expressed is desirable.

[0028]

[Formula 4]



[0029] Z1 and Z2 become independent respectively into [type (IVa) (IVc)]. (IVa) An oxygen atom or a sulfur atom is shown and R11, R12, R13, and R14 become independent respectively. A hydrogen atom or an alkyl group, Or R11, R13, and R12 and R14 may connect mutually, and they may form the carbon number 5 or the cycloalkene ring of 6. L4 The

monochrome and Tori who may have the substituent, or a pentamethine radical is shown. Two substituents on this TORI or a pentamethine radical may connect mutually, and may form the cycloalkene ring of carbon numbers 5-7. The pyrylium ring and the thia pyrylium ring may have the substituent, and two substituents which adjoin in that case may connect them mutually, and they may form the condensation benzene ring. X - An opposite anion is shown.]

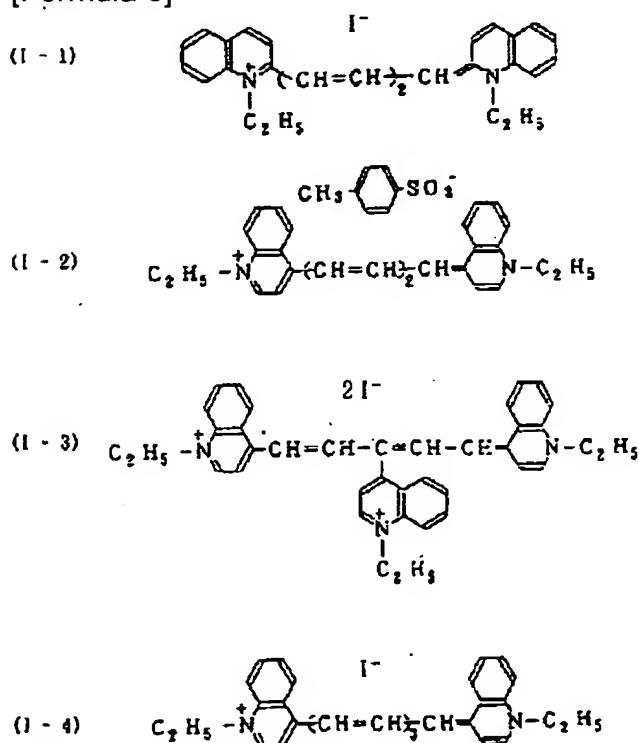
[0030] here -- a formula (IVa) -- and (IVa) (IVc) L4 As a substituent which can be set, an alkyl group, the amino group, or a halogen atom is mentioned, and aryl groups, such as a phenyl group and a naphthyl group, etc. are mentioned as a substituent in a pyrylium ring and a thia pyrylium ring.

[0031] In addition, said general formula (Ia - c), (II) (III), and (IVa-c) the opposite anion X that can be set - If it carries out For example, Cl⁻, Br⁻, I⁻, ClO₄⁻, and PF₆⁻, and BF₄⁻ and BCl₄⁻ etc. -- inorganic-acid anions, such as inorganic boric acid, -- Benzenesulfonic acid, p-toluenesulfonic acid, a naphthalene sulfonic acid, Organic-acid anions, such as organic boric acid which has organic radicals, such as an acetic acid and methyl, ethyl, propyl, butyl, phenyl, methoxyphenyl, naphthyl, difluoro phenyl, pentafluorophenyl, thienyl, and pyrrolyl, can be mentioned. Since the coloring matter which has a boric acid anion in a counter ion in these is excellent in the solubility over a spreading solvent, it is desirable from becoming usable [the solvent of a low-boiling point] etc.

[0032] As mentioned above, the Indore system expressed with the quinoline system coloring matter expressed with said general formula (Ia - c), and said general formula (II) or benzothiazole system coloring matter, and said general formula (III) Each example of the imino cyclohexadiene system coloring matter expressed and the pyrylium system expressed with said general formula (IVa-c), or thia pyrylium system coloring matter is shown below.

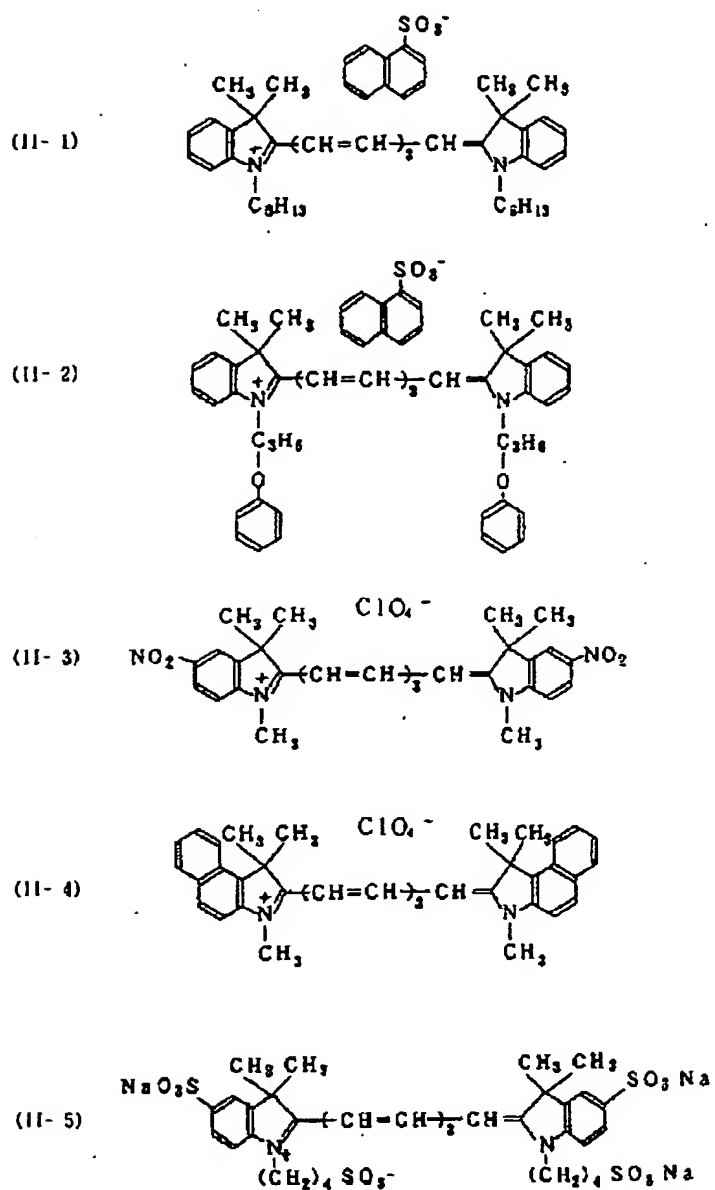
[0033]

[Formula 5]

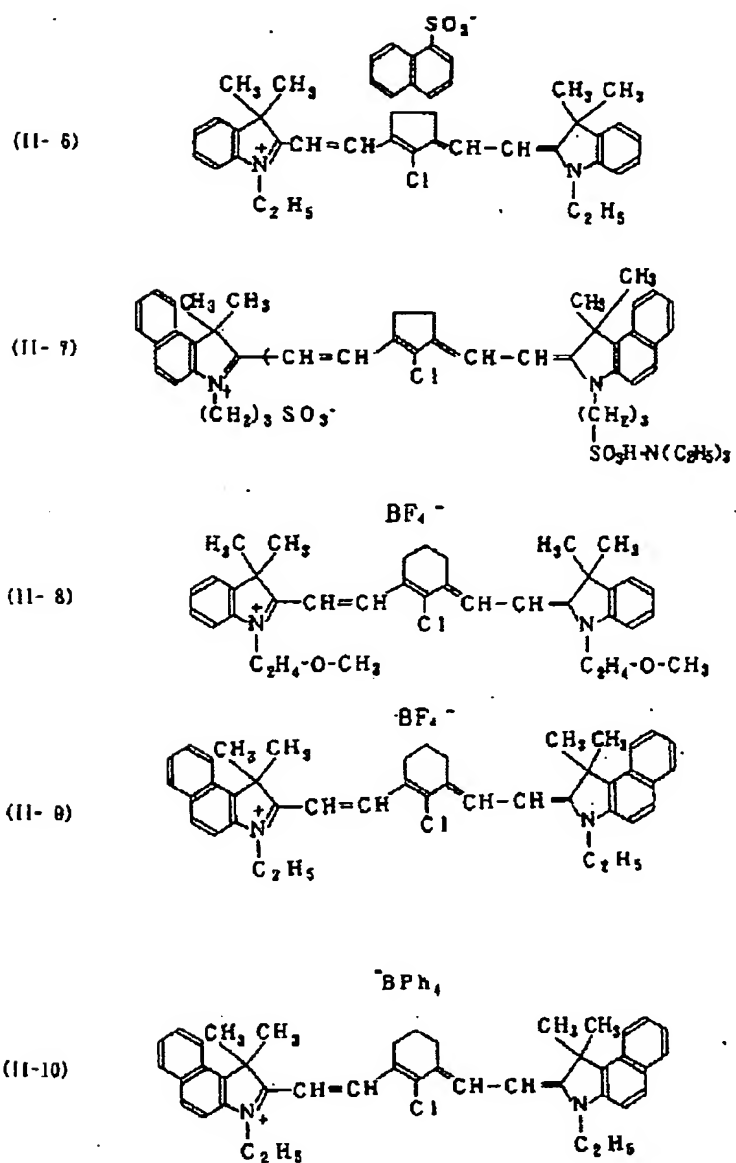


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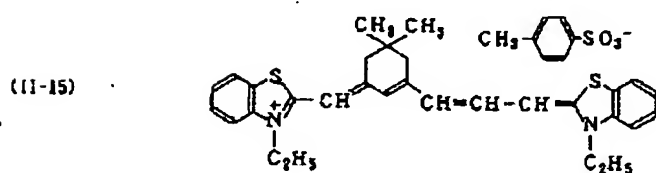
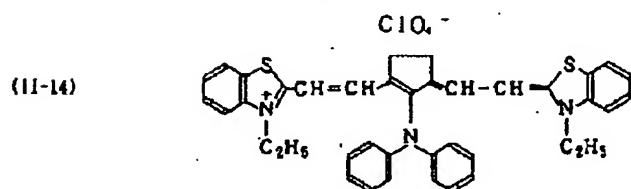
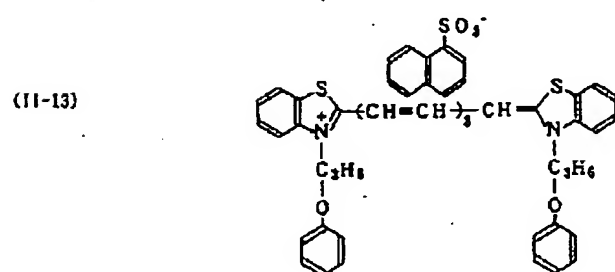
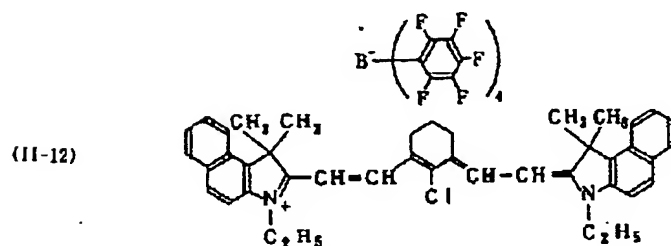
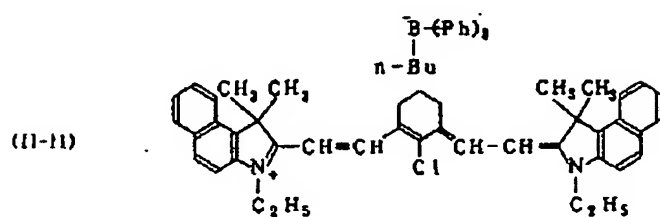
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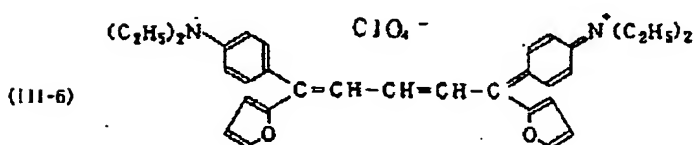
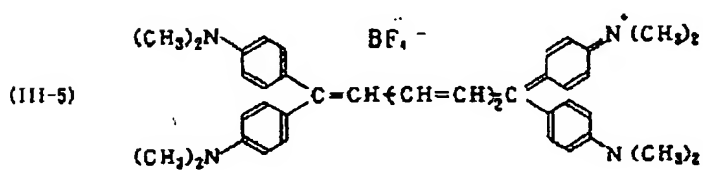
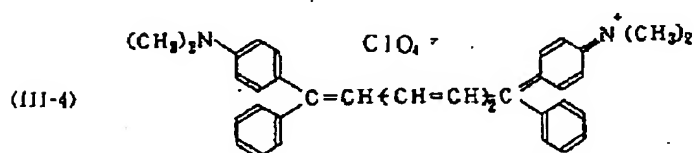
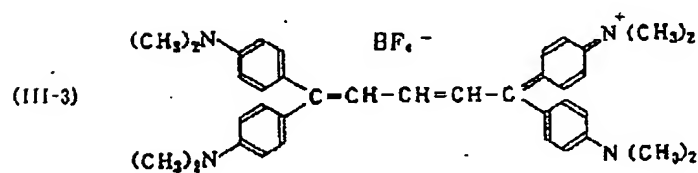
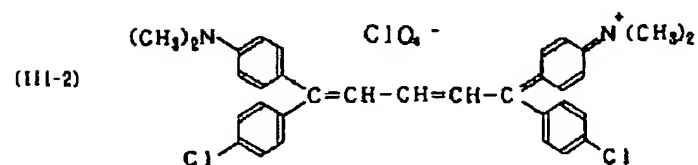
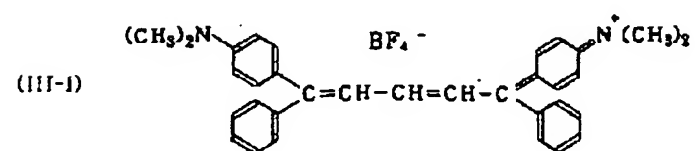
[0035]
[Formula 7]



[0036]
[Formula 8]

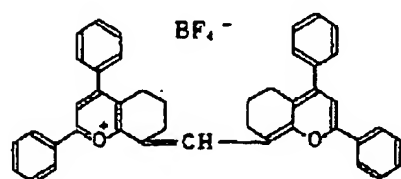


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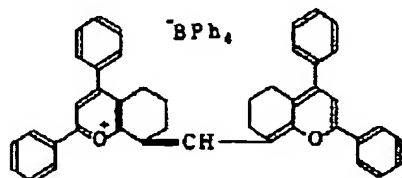


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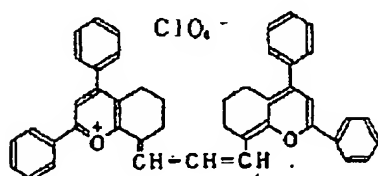
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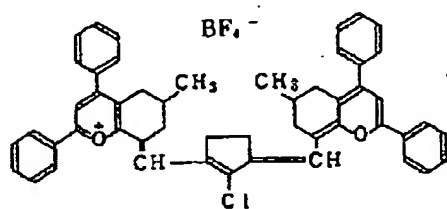
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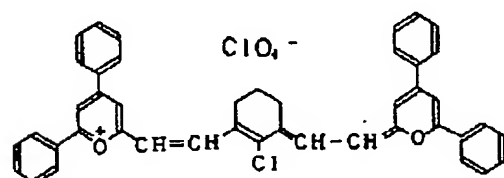
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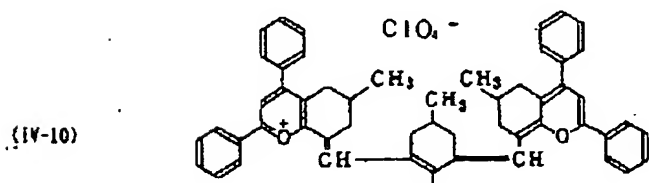
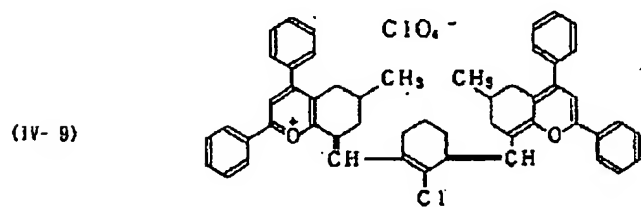
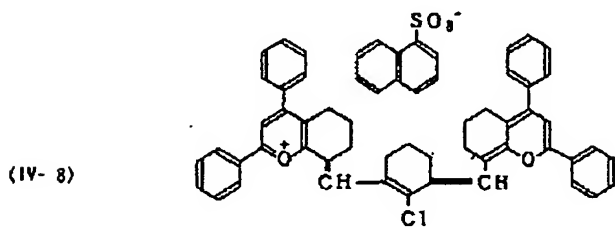
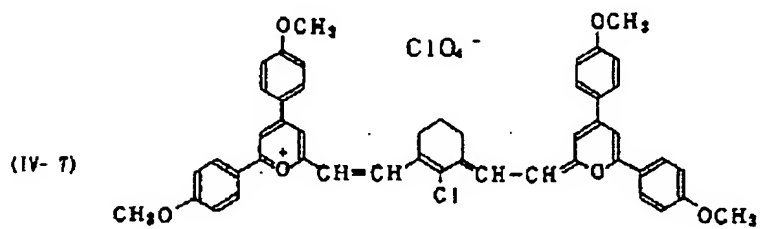
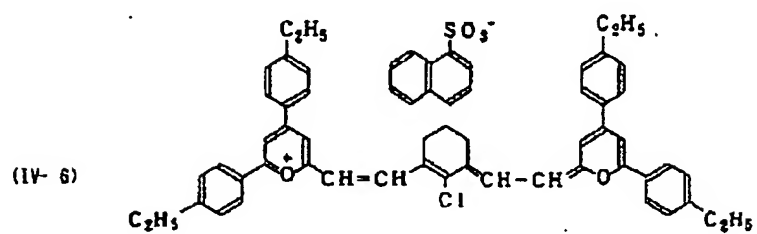
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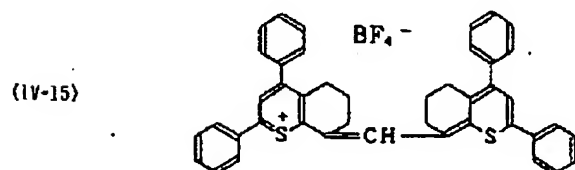
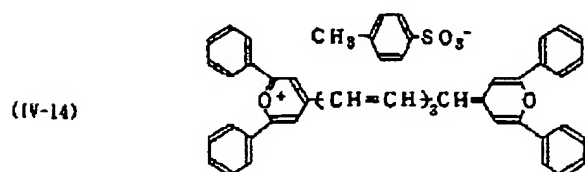
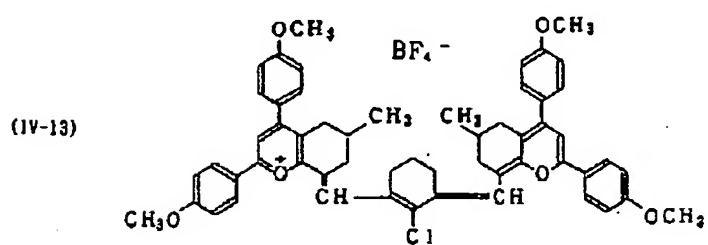
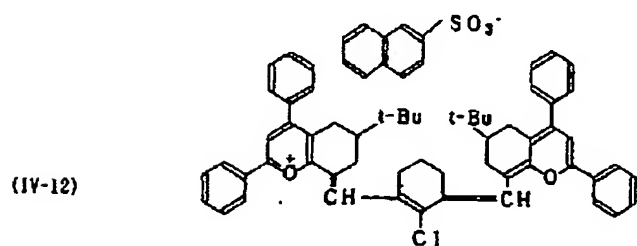
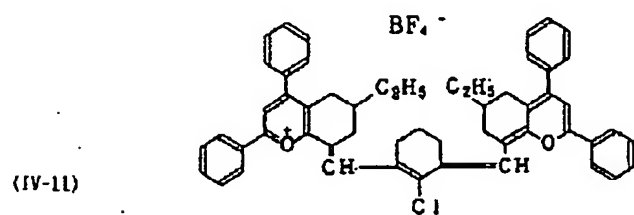
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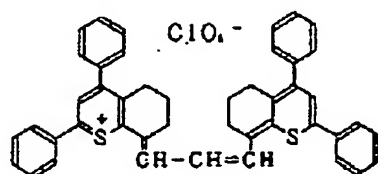


[0040]
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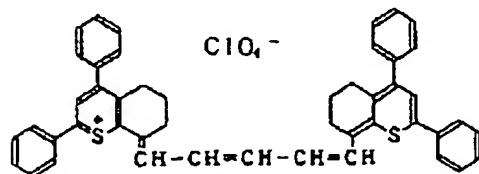


[0041]
[Formula 13]

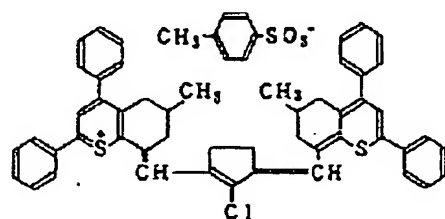
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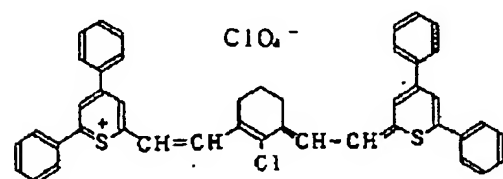
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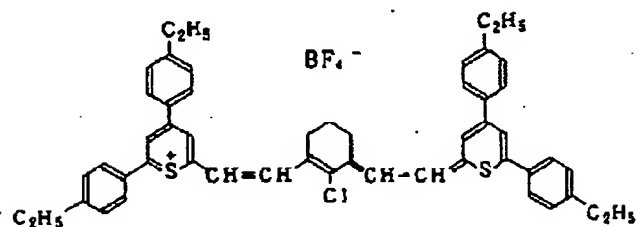
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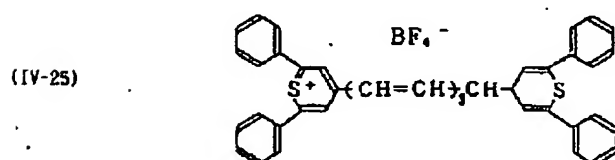
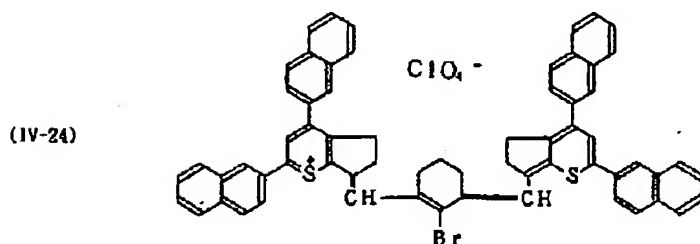
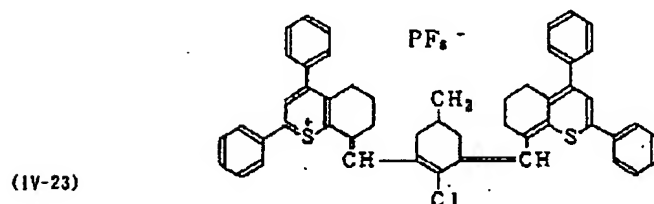
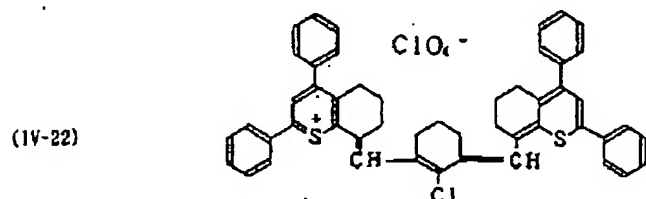
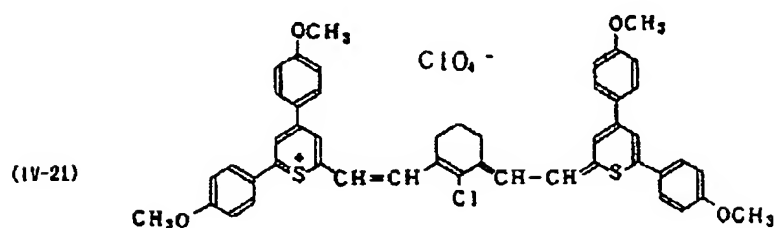
(IV-19)



(IV-20)



[0042]
[Formula 14]



[0043] Furthermore, the light-and-heat conversion matter of a publication can also be suitably used for Japanese Patent Application No. No. 93179 [ten to] by these people, 10-163444, 10-222567, etc. It is desirable that it is 0.5 - 30 % of the weight, it is usually 0.5 - 50 % of the weight, and it is [as for the content rate of said light-and-heat conversion matter in the positive type photosensitivity constituent in this invention, it is desirable that it is especially 1 - 20 % of the weight, and] still more desirable that it is 1 - 15 % of the weight. The positive type photosensitivity constituent in this invention uses novolak resin as an indispensable component further.

[0044] Novolak resin A phenol, o-cresol, m-cresol, P-cresol, 2, 5-xyleneol, 3,5-xyleneol, o-ethylphenol, m-ethylphenol, p-ethylphenol, a propyl phenol, n-butylphenol, tert-butylphenol, 1-naphthol, 2-naphthol, resorcinol, 4, and 4'-biphenyl diol, bisphenol A, At least one sort of phenols, such as pyrogallol, the bottom of an acid catalyst, formaldehyde, Aldehydes (in addition, it may replace with formaldehyde, a paraformaldehyde may be replaced with an acetaldehyde, and a paraldehyde may be used.), such as an acetaldehyde, propionaldehyde, a benzaldehyde, and a furfural Or are resin which carried out the polycondensation to at least one sort of ketones **, such as an acetone, a methyl ethyl ketone, and methyl isobutyl ketone,

and it sets to this invention in inside. The phenol as phenols, o-cresol, m-cresol, p-cresol, 2, 5-xyleneol, 3,5-xyleneol, and resorcinol, The formaldehyde as aldehydes or ketones, an acetaldehyde, a polycondensation object with propionaldehyde -- desirable -- especially -- m-cresol:p-cresol:2 and the mixed rate of 5-xyleneol:3,5-xyleneol:resorcinol -- a mole ratio -- the mixed phenols of 40-100:0-50:0-20:0-20:0-20 -- or phenol: -- m-cresol: -- the mixed rate of p-cresol of the polycondensation object of the mixed phenols of 1-100:0-70:0-60 and formaldehyde is desirable at a mole ratio. As for the positive type photosensitivity constituent of this invention, it is desirable to contain the solvent retardant mentioned later, and the mixed phenols of 70-100:0-30:0-20:0-20:0-20 or the mixed rate of phenol:m-cresol:p-cresol has [m-cresol:p-cresol:2 and the mixed rate of 5-xyleneol:3,5-xyleneol:resorcinol] the polycondensation object of the mixed phenols of 10-100:0-60:0-40, and formaldehyde desirable [in addition, / a constituent] at a mole ratio in that case in a mole ratio.

[0045] the weight average molecular weight (MW) of polystyrene conversion according [said novolak resin] to gel-permeation-chromatography measurement -- desirable -- 1,000-15,000 -- the thing of 1,500-10,000 is used especially preferably.

[0046] It becomes the inclination as for which sufficient paint film will not be obtained if a twist is also smaller than said range, but the solubility over an alkali developer will become small if larger than said range, the molecular weight of novolak resin becomes inadequate [the omission of an exposure part], and a positive image becomes is hard to be obtained.

[0047] Although the content rate of said novolak resin in the positive type photosensitivity constituent in this invention has width of face in this constituent by whether the below-mentioned dissolution retardant which permits content is an organic macromolecule, it is desirable that it is 20 - 95 % of the weight, it is usually 10 - 95 % of the weight, and it is [it is desirable that it is especially 40 - 90 % of the weight, and] still more desirable that it is 60 - 85 % of the weight.

[0048] It is a premise that the positive type photosensitivity constituent which constitutes the positive type photosensitivity constituent layer in this invention does not contain the pyrolysis nature matter like the above. Here, the pyrolysis nature matter is matter which has the property decomposed with the heat which said light-and-heat conversion matter absorbs the light of the image exposure light source, and generates. That is, although the light of the image exposure light source is absorbed and heat occurs in the exposure section among photosensitive constituent layers at the time of image exposure since the positive type photosensitivity constituent layer in this invention contains the light-and-heat conversion matter, the compound disassembled with this heat is not contained in the positive type photosensitivity constituent layer in this invention. as a pyrolysis nature compound, an onium salt, diazonium salt, and a quinone diazide compound which are indicated by JP,7-285275,A should mention, and, specifically, be -- **.

[0049] Although the positive type photosensitivity constituent in this invention does not contain an onium salt, diazonium salt, and a quinone diazide compound, it does not have susceptibility substantially to ultraviolet radiation by not containing these. It means not producing a significant difference in the solubility over an alkali developer, and more specifically not having an image formation function in practical semantics before and after the exposure by light with a wavelength of 360-450nm. If it puts in another way, the positive type photosensitivity constituent in this invention has the property which does not produce a substantial significant difference in the solubility over an alkali developer under a white fluorescent lamp (36by Mitsubishi Electric Corp. W white fluorescent lamp NEORUMI super FLR40 S-W/M/36), even if it leaves it in the optical reinforcement of 400 luxs for 10 hours. In addition, if a substantial significant difference is not produced in solubility, the solubility over an alkali developer means hardly changing before and after 10-hour neglect.

[0050] To the positive type photosensitivity constituent in this invention, in addition, besides

said light-and-heat conversion matter and novolak resin The need is accepted. For example, Victoria pure blue (42595), auramine O (41000), A KACHIRON brilliant flavin (BASIC 13), rhodamine 6G CP (45160), Rhodamine B (45170), a safranin O.K. 70:100 (50240) The ERIO glaucine X (42080), the first black HB (26150) No.120/RIO Nor Rui Heroux (21090), RIO Nor Rui Heroux GRO (21090), SHIMURA first yellow 8GF (21105), benzidine yellow 4T-564D (21095), Coloring agents, such as pigments, such as the SHIMURA farce tread 4015 (12355), the RIONORU red B4401 (15850), first gene blue TGR-L (74160), and RIONORU blue SM (26150), or a color, may contain. In addition, the figure in the aforementioned parenthesis means a Color Index (C. I.) here. As for the content rate of said coloring agent in the positive type photosensitivity constituent in this invention, it is desirable that it is 0 - 50 % of the weight, and it is desirable that it is especially 2 - 20 % of the weight.

[0051] Moreover, in the positive type photosensitivity constituent in this invention, it has the function to reduce the solubility of this novolak resin by using together with said novolak resin in order to increase the soluble difference over the alkali developer of the exposure section and a non-exposed area, the light of a near infrared region may hardly be absorbed to it, but the dissolution retardant which is not decomposed with the light of a near infrared region may contain in it. This dissolution retardant is presumed to be that to which the solubility over the alkali developer of this novolak resin is reduced by forming novolak resin and hydrogen bond.

[0052] The sulfonate indicated as the dissolution retardant by the Japanese-Patent-Application-No. No. 205789 [nine to] specification by the applicant for this patent at the detail, for example, Phosphoric ester, aromatic series carboxylate, aromatic series disulfon, a carboxylic anhydride, Aromatic ketone, aromatic aldehyde, aromatic amine, the aromatic series ether, etc., The lactone frame similarly indicated by the Japanese-Patent-Application-No. No. 291880 [nine to] specification at the detail, Similarly the base color-enhancing coloring matter which has the acid color-enhancing coloring matter which has an N and N-diaryl amide frame and a diaryl methylimino frame, the lactone frame indicated by the Japanese-Patent-Application-No. No. 301915 [nine to] specification at the detail, a thio lactone frame, and a sulfo lactone frame can be mentioned.

[0053] A surface active agent is mentioned as a dissolution retardant. Especially Furthermore, for example, polyethylene glycols Polyethylene-glycol polypropylene-glycol block copolymers Polyethylene glycol alkyl ethers and polyethylene-glycol polypropylene-glycol alkyl ether. Polyethylene-glycol alkylphenyl ether and polyethylene glycol fatty acid ester Polyethylene-glycol alkylamines, polyethylene-glycol alkylamino ether, A glycerine fatty acid ester and its polyethylene oxide addition products A sorbitan fatty acid ester and its polyethylene oxide addition products Nonionic surfactants, such as sorbitol fatty acid ester and its polyethylene oxide addition products, pen TAERI slit fatty acid ester and its polyethylene oxide addition products, and polyglyceryl fatty acid ester, are desirable. Eight or more HLB of a nonionic surface active agent is desirable, and especially its ten or more HLB is desirable.

[0054] In more than, as a dissolution retardant in this invention sulfonates and the acid color-enhancing coloring matter which has a lactone frame -- and They are ten or more HLB. Polyethylene glycols and polyethylene-glycol polypropylene-glycol block copolymers Polyethylene glycol alkyl ethers, polyethylene-glycol alkylphenyl ether, Polyethylene glycol fatty acid ester, a glycerine fatty acid ester, and its polyethylene oxide addition products A sorbitan fatty acid ester and its polyethylene oxide addition products Especially nonionic surfactants, such as sorbitol fatty acid ester and its polyethylene oxide addition products, pen TAERI slit fatty acid ester, and polyglyceryl fatty acid ester, are desirable, and the acid color-enhancing coloring matter which has a lactone frame is still more desirable.

[0055] It is desirable that it is 0 - 30 % of the weight, as for the content rate of said dissolution retardant in the positive type photosensitivity constituent in this invention, it is desirable that it is especially 0 - 20 % of the weight, and it is still more desirable that it is 0 - 15 % of the weight.

Moreover, in the positive type photosensitivity constituent in this invention, grant of undershirt development nature etc. is electric dissociation exponent preferably for the purpose of amelioration of development nature. Two or more organic acids and the anhydride of the organic acid may contain.

[0056] As the organic acid and its anhydride, for example JP,60-88942,A, What was indicated by JP,63-276048,A and JP,2-96754,A each official report etc. is used. Specifically A glyceric acid, a methylmalonic acid, a dimethyl malonic acid, a propyl malonic acid, A succinic acid, a malic acid, mesotartaric acid, a glutaric acid, beta-methyl glutaric acid, beta and beta-dimethyl glutaric-acid, beta-ethyl glutaric-acid, beta, and beta-diethyl glutaric acid, beta-propyl glutaric-acid, beta, and beta-methylpropyl glutaric acid, a pimelic acid, Aliphatic series saturation carboxylic acids, such as a suberic acid and a sebacic acid, a maleic acid, a fumaric acid, Aliphatic series unsaturated-carboxylic-acid [, such as glutaconic acid], 1, and 1-cyclobutane dicarboxylic acid, 1, 3-cyclobutane dicarboxylic acid, 1, and 1-cyclopentane dicarboxylic acid, 1, 2-cyclopentane dicarboxylic acid, 1, and 1-cyclohexane dicarboxylic acid, 1, 2-cyclohexane dicarboxylic acid, 1, 3-cyclohexane dicarboxylic acid, Ring type saturation carboxylic acids, such as 1 and 4-cyclohexane dicarboxylic acid, 1, 2-cyclohexene dicarboxylic acid, 2, 3-dihydroxybenzoic acid, 3, 4-dimethyl benzoic acid, 3, 4-dimethoxy benzoic acid, 3, 5-dimethoxy benzoic acid, Para toluylic acid, 2-hydroxy-para toluylic acid, 2-hydroxy-meta toluylic acid, 2-hydroxy-ortho toluylic acid, mandelic acid, a gallic acid, a phthalic acid, ring type unsaturated carboxylic acid, such as isophthalic acid and a terephthalic acid, -- and Anhydrides, such as a mel drum acid, an ascorbic acid, a succinic anhydride, an anhydrous glutaric acid, a maleic anhydride, a cyclohexene dicarboxylic acid anhydride, a cyclohexane dicarboxylic acid anhydride, and phthalic anhydride, can be mentioned. It is desirable that it is 0 - 30 % of the weight, as for said organic acid in the positive type photosensitivity constituent in this invention, and the content rate of the anhydride of the organic acid, it is desirable that it is especially 0 - 20 % of the weight, and it is still more desirable that it is 0 - 10 % of the weight.

[0057] In the positive type photosensitivity constituent in this invention, various kinds of additives usually used, such as a color, a pigment, a spreading nature amelioration agent, a development nature amelioration agent, an adhesion amelioration agent, a sensibility amelioration agent, and an affinitizing agent, may contain in 0.1 - 5% of the weight of the range still more preferably 10 or less % of the weight preferably further 20 or less % of the weight in addition to said component.

[0058] The positive image formation ingredient which has a photosensitive constituent layer in a support surface is obtained by heating said positive type photosensitivity constituent in this invention, after usually applying said each component to a support surface as a solution which dissolved in the suitable solvent, and drying.

[0059] As the solvent, it has sufficient solubility to a use component here. Although there will be especially no limit if good paint film nature is given, for example Methyl cellosolve, Cellosolve system solvents, such as ethylcellosolve, methyl-cellosolve acetate, and ethylcellosolve acetate, Propylene glycol monomethyl ether, the propylene glycol monoethyl ether, The propylene glycol monobutyl ether, propylene-glycol-monomethyl-ether acetate, Propylene glycol monoethyl ether acetate, propylene glycol monobutyl ether acetate, Propylene glycol system solvents, such as dipropylene glycol wood ether, Butyl acetate, amyl acetate, ethyl butylate, butyl butyrate, a diethyl OKISA rate, Pyruvic-acid ethyl and ethyl-2-hydroxy butyrate, ethyl acetoacetate, Ester solvent, such as methyl lactate, ethyl lactate, and 3-methoxy methyl propionate, Alcoholic solvent, such as heptanol, a hexanol, diacetone alcohol, and furfuryl alcohol, High polar solvents, such as ketone solvent, such as a cyclohexanone and methyl amyl ketone, dimethylformamide, dimethylacetamide, and N-methyl pyrrolidone, or these mixed solvents, the thing that added aromatic hydrocarbon are further

mentioned to these. The range of the operating rate of a solvent is usually about 1 to 20 times in a weight ratio to the total amount of a photosensitive constituent.

[0060] Moreover, as the method of application, a well-known approach, for example, rotation spreading, wire bar spreading, DIP spreading, the Ayr knife spreading, roll coating, blade spreading, curtain spreading, etc. can be used conventionally. although coverage changes with applications -- as desiccation thickness -- usually -- let especially 0.5-5-micrometer 0.3-7 micrometers preferably be the range of 1-3 micrometers. in addition -- as the drying temperature in that case -- about 60-170 degrees C -- desirable -- as about 70-150 degrees C and the drying time -- 5 seconds - a 10-minute about room -- 10 seconds - a 5-minute about room is taken preferably. In addition, it is desirable for about 40-120 degrees C to be about 40-70 degrees C in temperature preferably, for example, to perform afterbaking processing of 30 minutes - about 75 hours preferably for 5 minutes to about 100 hours for the purpose of the improvement in the contrast at the time of image formation, improvement in the stability of image formation nature with the passage of time, etc.

[0061] Moreover, the paper which stuck metallic foils, such as a metal plate which plated or vapor-deposited metal plates, such as aluminum, zinc, copper, and steel, aluminum, zinc, copper, iron, chromium, nickel, etc., paper, paper which applied resin, and aluminum, as the base material, plastic film, the plastic film which carried out hydrophilization processing, a glass plate, etc. are mentioned. An aluminum plate is desirable in inside, all conventionally well-known as an object for the printing versions are possible, for example, A1000 system (pure aluminium), A3000 (aluminum-Mn) system, A5000 (aluminum-Mg) system, etc. are mentioned by JIS. The aluminum plate with which surface treatment, such as sealing, was performed especially the graining processing by the electrolytic etching or brushing in the inside of a hydrochloric acid or a nitric-acid solution, anodizing in the inside of a sulfuric-acid solution, and if needed is more desirable. Moreover, as granularity of a support surface, it is JIS. Average-of-roughness-height Ra specified to B0601 0.3-1.0 micrometers is usually preferably set to about 0.4-0.8 micrometers.

[0062] As the light source which carries out image exposure of the positive type photosensitivity constituent layer in this invention, mainly although the laser light sources, such as HeNe laser, an Ar ion laser, an YAG laser, HeCd laser, semiconductor laser, and ruby laser, are mentioned In carrying out image formation with the heat which absorbed light and was generated especially The light source which generates a 650-1300nm near-infrared laser beam is desirable, for example, solid state laser, such as ruby laser, an YAG laser, semiconductor laser, and LED, can be mentioned, and especially small and long lasting semiconductor laser and an YAG laser are desirable. According to these light sources, after carrying out scan exposure, negatives are usually developed with a developer, and an image is formed.

[0063] In addition, although the laser light source usually scans a photosensitive constituent layer front face as a beam of light (beam) of the high intensity condensed with the lens, it may depend for the sensibility property (mJ/cm^2) of the photosensitive constituent layer in this invention which induces it on the optical reinforcement ($\text{mJ}/\text{s}\cdot\text{cm}^2$) of the laser beam which receives light. Here, it can ask for the optical reinforcement of a laser beam by $\frac{\text{mJ}}{\text{s}}$ (ing) the amount (mJ/s) of energy per unit time amount of the laser beam measured with the optical power meter in the exposure area (cm^2) of the laser beam in a photosensitive constituent layer front face. The exposure area of a laser beam is usually 1 of laser peak intensity / e^2 . Although it defines as the area of the part exceeding reinforcement, the photosensitive constituent in which reciprocity law is shown in simple can be exposed, and it can also measure. It sets to this invention and is $2.0 \times 10^6 \text{ mJ}/\text{s}\cdot\text{cm}^2$ as optical reinforcement of the light source. Considering as the above is desirable and it is $1.0 \times 10^7 \text{ mJ}/\text{s}\cdot\text{cm}^2$. Especially the thing to consider as the above is desirable. If optical reinforcement is said range, the scan exposure

time which may raise the sensibility property of the positive type photosensitivity constituent layer in this invention can be shortened, and it will become a big advantage practical.

[0064] As a developer which uses said positive type photosensitivity constituent layer in this invention for the development of a positive type image formation ingredient which carried out image exposure For example, a specific silicate, a potassium silicate, a silicic acid lithium, silicic acid ammonium, Specific metasilicate, a meta-potassium silicate, a sodium hydroxide, a potassium hydroxide, A lithium hydroxide, a sodium carbonate, sodium bicarbonate, potassium carbonate, The second sodium phosphate, sodium tertiary phosphate, ammonium secondary phosphate, Inorganic alkali salt, such as the third ammonium phosphate, sodium borate, a boric acid potassium, and ammonium borate, Monomethylamine, dimethylamine, a trimethylamine, a monoethyl amine, Diethylamine, triethylamine, mono-isopropylamine, diisopropylamine, About 0.1 - 5% of the weight of the water solution of organic amine compounds, such as a monobutyl amine, monoethanolamine, diethanolamine, triethanolamine, monoisopropanolamine, and diisopropanolamine, is used as an alkali developer. The alkali developer which contains the silicate of alkali metal, such as a specific silicate which is inorganic alkali salt, a potassium silicate, and a silicic acid lithium, especially is desirable.

[0065] The silicate of the alkali metal of the developer in this invention is 0.1 - 5 % of the weight in the content as a silicon dioxide. And it is desirable that it is 0.1-1.5 in the ratio $([\text{SiO}_2]/[\text{M}])$ of the mol concentration $([\text{SiO}_2])$ of a silicon dioxide to the mol concentration $([\text{M}])$ of alkali metal. It is desirable that it is 0.2 - 3 % of the weight in the content as a silicon dioxide, and is especially 0.2-1.0 in the ratio of the mol concentration of a silicon dioxide to the mol concentration of alkali metal. if $[\text{SiO}_2] / [\text{M}]$ is remarkably low -- adhesion (printing dirt) of the fall of a development rate, the soluble defect (greasing) of the non-image part at the time of development, and the ink to the non-image part at the time of printing -- a lifting -- easy -- if $[\text{SiO}_2] / [\text{M}]$ is remarkably high on the contrary, a deposit of the alkali-metal salt in a developer with the passage of time will pose a problem being easy to generate.

[0066] Also in the above mentioned developer, solubility [as opposed to the water of alkali salt in the thing containing the hydroxide of alkali metal and the silicate of alkali metal] is excellent, and preparation of a developer is desirable at an easy point. Furthermore, 12 or more are [pH] desirable especially desirable, and the alkali developers in this invention are 12.5-14.0. If pH becomes poor [the omission nature of the exposure section] under in said range and pH of pH is remarkably high, it will become easy to come into a developer out of insoluble matter, and, in any case, width of face of development conditions will be narrowed.

[0067] In this invention, depending on the developer which does not contain an amphoteric surface active agent, it is indispensable to make a developer contain an amphoteric surface active agent, the survival rate of the amount of paint films is good, and, moreover, the purpose of this invention that scratch-proof nature is also good cannot be attained. Moreover, there is an inclination for improvement in sensibility and a development rate, improvement in the development capacity (development area of a sensitization layer) of a developer, and control of degradation of a developer with the passage of time to be accepted, by containing an amphoteric surface active agent in a developer.

[0068] As an amphoteric surface active agent, moreover, N-lauryl-N and N-dimethyl-N-ammonium, N-stearyl-N and N-dimethyl-N-carboxy ammonium, N-lauryl-N and N-dihydroxyethyl-N-carboxy ammonium, N-lauryl-N and N-dihydroxyethyl-N-carboxymethyl ammonium, N-lauryl - Betaine mold compounds, such as N, N, and N-tris (carboxymethyl) ammonium, N - Imidazoline mold compounds, such as palm-oil-fatty-acid acyl-N-carboxymethyl-N-hydroxyethyl ethylenediamine sodium, can be mentioned.

[0069] In the above surface active agent, betaine mold compounds are especially desirable. Said surfactant is made to usually contain by 0.001 - 1% of the weight of concentration still more preferably 0.001 to 5% of the weight preferably especially 0.0005 to 10% of the weight

0.0001 to 20% of the weight in an alkali developer. There is a possibility that the effectiveness of this invention may not be enough acquired if fewer than the above-mentioned range, and if many [remarkably / too], while there will be a possibility that the problem of ***** for foaming and an unexposed photosensitivity layer may arise and a continuation development will become difficult as a result, the repeatability of a photosensitive layer image falls. Furthermore, the width of face of development conditions becomes large by being the above-mentioned range.

[0070] Furthermore, as an alkali developer which uses the positive type photosensitivity constituent layer in this invention for the development of a positive type photo conductor which carried out image exposure, it is desirable to contain silicone. By containing silicone, it becomes possible to control film decrease of the unexposed section further, and it becomes possible to expand the width of face of development conditions as a result. Siloxane association is made into a frame as silicone. Moreover, specifically For example, in the silicon oil and silicone resin in which a part of dimethylpolysiloxane or its methyl group has the principal chain permuted by hydrogen or the phenyl group A solution mold, an emulsion mold, and the silicon oil used as compound dies are desirable. In inside What is used as a defoaming agent is desirable, and especially the thing that has the hydrophilic radical of a self-emulsification mold still like the copolymer of dimethylpolysiloxane and polyalkylene oxide is desirable. As for especially the content of the silicone in the alkali developer in this invention, it is desirable that it is 5-1000 ppm 1-10000 ppm.

[0071] To the developer of this invention, in addition, besides said alkali chemicals and said surfactant The need is accepted. Further Water-soluble organic solvents, such as polyhydric alcohol, aromatic alcohol, and alicyclic alcohol, Water softeners, such as polyphosphate, an amino polycarboxylic acid salt, and an organic sulfonate, Reducing agents, such as a phenol nature compound, an amine compound, a sulfite, phosphite, and thio phosphate, Additives, such as defoaming agents, such as pH regulators, such as chelating agents, such as organic phosphonic acid, phosphono alkane tricarboxylic acid, and those salts, an alkali fusibility mercapto compound or a thioether compound, an inorganic acid, organic acids, and those salts, and an organic silane compound, can be made to contain. These additives can be made to contain by 0.005 - 3% of the weight of concentration preferably especially 0.001 to 5% of the weight in an alkali developer. In addition, about 10-50 degrees C of development are usually especially made preferably by immersion development, spray development, brush development, ultrasonic development, etc. at the temperature of about 15-45 degrees C.

[0072] It is what can form a positive type image by the very simple system which considers the light-and-heat conversion matter and novolak resin as a basic presentation, and cannot expect a chemical change in this invention. That this image formation is performed by change of those other than a chemical change For example, when the photosensitive constituent in this invention which once performed the optical exposure is heated near 50 degree C for 24 hours, immediately after exposure, it can guess also from the reversible phenomenon in which the alkali fusibility of the exposure section which increased returns to the condition that it is often near before exposure being accepted. Furthermore, as for the glass transition temperature of the photosensitive constituent itself or softening temperature in this invention, and the ease of happening of the reversible phenomenon, it is also the proof that the relation that the reversible phenomenon tends to happen is accepted, so that glass transition temperature or softening temperature is low.

[0073] Although the reason the photosensitive constituent in this invention forms a positive type image by such device is not necessarily clear The alkali fusibility high polymer of the part from which the light energy absorbed with the light-and-heat conversion matter was changed into heat, and received the heat the change of those other than some chemical changes, such as conformation change, a lifting, When the alkali fusibility of the part increases, it is thought

that an image is formed with an alkali developer and the detail of this is indicated by the Japanese-Patent-Application-No. No. 205789 [nine to] specification by the applicant for this patent.

[0074] And since the heat generated by light absorption near the interface with a base material while light absorption effectiveness was low carries out thermal diffusion to a base material by comparing near [the] the front face in the photosensitive constituent layer based on an operation of the light-and-heat conversion matter like this invention, the soluble endowment effectiveness over a developer is small. Therefore, the omission nature of the sensitization layer near the base material of the exposure section becomes inadequate, and this invention solves the problem by taking specific development conditions to film decrease of a non-exposed area having occurred, or there having been a thing problem, when the contrast of the exposure section and a non-exposed area was inferior or having been asked for sufficient omission of the exposure section.

[0075]

[Example] Hereafter, although an example explains this invention still more concretely, this invention is not limited to the following examples, unless the summary is exceeded. In addition, the used alkali developer is shown below.

** The water solution containing 1.0 % of the weight (it is the same $\text{SiO}_2/\text{Na}_2\text{O}=3/1$ (weight ratio), and the following.) of specific silicates, 1.0 % of the weight of sodium hydroxides, and 0.01 % of the weight (the Kao Corp. make, "ANHI toll 24B") of betaine mold amphoteric surface active agents. ($[\text{SiO}_2]/[\text{M}]=0.37$)

** The water solution containing 1.0 % of the weight of specific silicates, 1.0 % of the weight of sodium hydroxides, and 0.01 % of the weight (the Kao Corp. make, "ANHI toll 86B") of betaine mold amphoteric surface active agents. ($[\text{SiO}_2]/[\text{M}]=0.37$)

** The water solution containing 1.0 % of the weight of specific silicates, 1.0 % of the weight of sodium hydroxides, and 0.01 % of the weight (the Kao Corp. make, "emulgen A-60") of polyoxyalkylene mold Nonion nature surfactants. ($[\text{SiO}_2]/[\text{M}]=0.37$)

** The water solution containing 1.0 % of the weight of specific silicates, 1.0 % of the weight of sodium hydroxides, and 0.01 % of the weight (the Kao Corp. make, "emulgen PP-150") of polyoxyalkylene mold Nonion nature surfactants. ($[\text{SiO}_2]/[\text{M}]=0.37$)

** The water solution containing 1.0 % of the weight of specific silicates, 1.0 % of the weight of sodium hydroxides, and 0.01 % of the weight (the Kao Corp. make, "Pelex NBL") of sulfonic-acid sodium mold anionic surfactants. ($[\text{SiO}_2]/[\text{M}]=0.37$)

** The water solution containing 1.0 % of the weight of specific silicates, 1.0 % of the weight of sodium hydroxides, and 0.01 % of the weight (the Kao Corp. make, "Pelex SS-H") of sulfonic-acid sodium mold anionic surfactants. ($[\text{SiO}_2]/[\text{M}]=0.37$)

** The water solution containing 1.0 % of the weight of specific silicates, and 1.0 % of the weight of sodium hydroxides. ($[\text{SiO}_2]/[\text{M}]=0.37$)

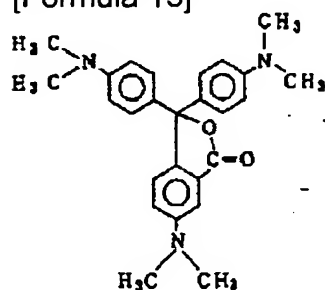
In addition, a silicon content is 0.75 % of the weight as a silicon dioxide about both above-mentioned developer ** - **.

[0076] After performing indirect desulfurization fat processing for an aluminum plate (the quality of the material 1050, temper H16) with an example 1 thickness of 0.24mm at 60 degrees C for 1 minute in 5% of the weight of a sodium-hydroxide water solution, electrolytic etching processing was performed in the hydrochloric-acid water solution with a concentration of 0.5 mols [l.] on the temperature of 28 degrees C, current density 60 A/dm², and the conditions for processing-time 40 seconds. Subsequently, after performing 60 degrees C and the desmut treatment for 12 seconds in a 4-% of the weight sodium-hydroxide water solution, anodizing was performed in the 20-% of the weight sulfuric-acid solution on the temperature of 20 degrees C, current density 3.5 A/dm², and the conditions for processing-time 1 minute. Furthermore, 80-degree C hot water performed boiling water sealing for 20 seconds, and the

aluminum plate for the lithography version base materials was produced. The value of average-of-roughness-height Ra of this plate by the surface roughness meter (the Kosaka Laboratory, Ltd. make, "SE-3DH") was 0.60 micrometers. To the obtained aluminum plate support surface, as an alkali fusibility organic high polymer phenol: -- m-cresol: -- the mixed rate of p-cresol with the mixed phenols of 20:50:30 by the mole ratio As the novolak resin (MW 4000) 100 weight section and the light-and-heat conversion matter which consist of a polycondensation object with formaldehyde As the Indore system coloring matter 10 weight section and the dissolution retardant which were shown by said example (II-9) The coating liquid which dissolved the acid color-enhancing coloring matter 10 weight section of the following structure which has a lactone frame in the cyclohexanone 900 weight section is applied using a wire bar. It is amount of paint films 2.8 g/m² by carrying out afterbaking processing at 55 degrees C for 16 hours, after making it dry for 2 minutes at 90 degrees C. The positive type photosensitivity lithography version which has a positive type photosensitivity constituent layer was produced.

[0077]

[Formula 15]



[0078] the aligner (the Creo Co., Ltd. make --) which makes 830nm semiconductor laser the light source about the obtained positive type photosensitivity lithography version It sets in it being immersed in the alkali developer shown in Table 1 about the positive type photoconductor which carried out image exposure, and developing 212 lines and 3 - 97% of halftone dot image with various kinds of exposure energy, using "Trend Setter 3244T." The approach shown below estimated sensibility, a remaining rate of membrane, and scratch-proof nature, and the result was shown in Table 1 by it.

[0079] After being immersed in the developer for 30 seconds by the sensibility of 28 degrees C, the light exposure (mJ/cm²) which 3% of halftone dot image when sponge performs grinding development 5 times reproduces was calculated.

The reflection density before and behind the development of the streak part of the sample after remaining-rate-of-membrane exposure was measured with the Macbeth reflection density plan, and it computed by the following formula.

[0080]

[Equation 1]

$$\text{残膜率 (\%)} = \frac{\text{現像後画線部反射濃度} - \text{非画線部の反射濃度}}{\text{未現像画線部反射濃度} - \text{非画線部反射濃度}}$$

[0081] A: 95% or more of survival rates.

B: 90% or more of survival rates, less than 95%.

C: 70% or more of survival rates, less than 90%.

D: Less than 70% of survival rates.

25cm² when sponge performs grinding development 5 times after carrying out image exposure with the light exposure of the scratch-proof nature aforementioned sensibility and being

immersed in the developer for 60 seconds at 28 degrees C Visual observation of the image section front face was carried out, and the following criteria estimated the existence of a linear abrasion. In addition, image repeatability will be inferior in the thing with an abrasion.

A: With no abrasion all **.

B: Less than five abrasions.

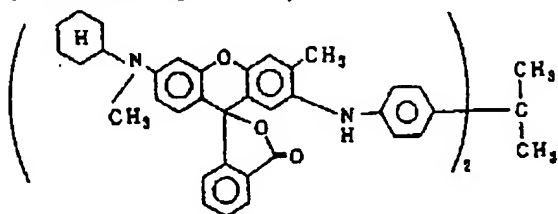
C: Less than 20 or more 5 abrasions.

D: 20 or more abrasions.

[0082] Like the example 1, the outside of having changed into the acid color-enhancing coloring matter of an example 2 and the following structure of having a lactone frame as a dissolution retardant in 3 photosensitivity constituent layer, and having used the alkali developer shown in Table 1 produced the positive type photo conductor, evaluated development nature, and showed the result in Table 1.

[0083]

[Formula 16]



[0084] It changed into the same acid color-enhancing coloring matter 5 weight section as having used in the examples 2 and 3 as a dissolution retardant in examples 4-5, the example 1 of a comparison - 5 photosensitivity constituent layer, and the Nonion nature surfactant (Kao Corp. make, gold ["gold / LEO / 430 / "]) 5 weight section was added further, And like the example 1, the outside of having used the alkali developer shown in Table 1 produced the positive type photo conductor, evaluated development nature, and showed the result in Table 1.

[0085]

[Table 1]

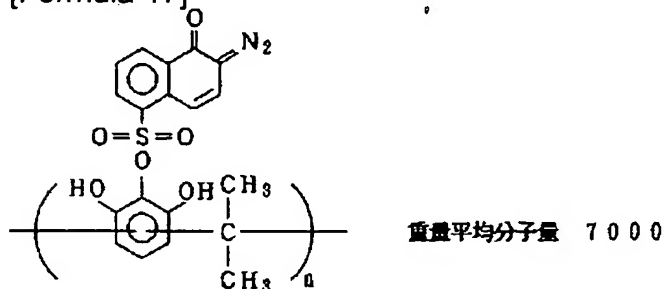
表 1

	現像液	感度 (mJ/cm ²)	塗膜量 残存率	擦り傷欠 陥の有無	界面活性 剤の種類	界面活性剤 の含有量 (重量%)
実施例 1	①	300	A	A	両性	0.01
実施例 2	①	200	A	A	両性	0.01
実施例 3	②	300	A	A	両性	0.01
実施例 4	①	200	A	A	両性	0.01
実施例 5	②	200	A	A	両性	0.01
比較例 1	⑦	—*	D	D	なし	0
比較例 2	③	500	B	B	ノニオン	0.01
比較例 3	④	500	B	B	ノニオン	0.01
比較例 4	⑤	300	A	B	アニオン	0.01
比較例 5	⑥	300	A	B	アニオン	0.01

* The omission of the exposure section is imperfect and image formation is improper.

[0086] After leaving the photosensitive lithography version of example of reference 1 example 1 for 10 hours under the 400 lux white fluorescent lamp (36W white fluorescent lamp NEORUMI super FLR40 S-W/M [the Mitsubishi Electric Corp. make and]/36) of optical reinforcement, the property of sensibility equivalent to an example 1, and the place and example 1 which performed same evaluation, the amount survival rate of paint films, and scratch-proof nature was shown. o-quinone diazide of the following [constituent / photosensitive] on the other hand [0087]

[Formula 17]



[0088] Although place and sensibility:350 mJ/cm² which evaluated by producing the photosensitive lithography version like an example 1 except carrying out 10 weight sections addition, amount survival rate of paint films:A, and abrasion defective:A were shown After leaving this sample containing o-quinone diazide under the above-mentioned white fluorescent lamp for 5 hours, the film decrease of a place and a remarkable photosensitive layer which performed same evaluation arose, and evaluation of sensibility and an abrasion defect was not completed.

[0089] After performing indirect desulfurization fat processing for an example 6 - 18 aluminum plates (0.24mm in thickness) at 60 degrees in a 3-% of the weight sodium-hydroxide bath for 1 minute, They are 25 degrees C and 80 A/dm² in a hydrochloric-acid bath with a concentration of 12g [l.]. Electrolytic etching processing is performed for 10 seconds with current density. A desmut treatment is carried out for 3 seconds at 50 degrees C in a sodium-hydroxide bath with a concentration of 10g [l.] after rinsing, and they are 30 degrees C and 10 A/dm² after rinsing and in a 30-% of the weight sulfuric-acid bath. Anodizing was performed for 15 seconds with current density. Furthermore, by 90 degrees C and pH9, boiling water sealing was carried out, it rinsed and dried, and the aluminum plate for the lithography version base materials was produced. To the obtained aluminum plate support surface, as light-and-heat conversion matter as the Indore system coloring matter (Nippon Kayaku Co., Ltd. make, "CY-10") 4 weight section shown by said example (II-8), and an alkali fusibility organic high polymer the novolak resin (MW 9400 and the product made from Sumitomo DEYUREZU --) which carried out the polycondensation of the mixed phenol of phenol / m-cresol / p-cresol =50/30/20 (mole ratio) with formaldehyde As the "SK-188" 100 weight section and a dissolution retardant, as the polyethylene-glycol (Toho Chemical Industry Co., Ltd. make, "PEG#2000") 4 weight section and a development nature amelioration agent Desiccation thickness is 2.5 g/m² by applying and drying the coating liquid which dissolved the 1 and 2-cyclohexane dicarboxylic acid 5 weight section in the methyl-cellosolve 1000 weight section using a wire bar. The positive type photosensitivity lithography version which has a positive type photosensitivity constituent layer was produced.

[0090] the obtained positive type photosensitivity lithography version -- attaching -- a laser exposure machine (the product made from Creo --) They are 200 mj/cm² at "Trendsetter 3244T". After exposing, 28.30g of potassium silicates and 7.12g of potassium hydroxides are dissolved in 464.58g of water. The content as a silicon dioxide 1.5 % of the weight and nothing, The amphoteric surface active agent ("Amogen K" by Dai-Ichi Kogyo Seiyaku Co.,

Ltd.) of a betaine mold compound in furthermore, the alkali water solution of pH13.3 added 800 ppm When developing negatives using the developer which added and produced the silicone shown in Table 1, the longest time amount to which the exposure section is completely removed within 2 minutes, and the remaining rate of membrane of a non-exposed area can hold 90% or more was evaluated as development condition width of face, and the result was shown in Table 1. In addition, after the remaining rate of membrane was immersed for 60 seconds at 28 degrees C, it measured the reflection density before and behind the development in a non-exposed area when sponge performs grinding development 5 times with the Macbeth reflection density plan, and asked for it from the ratio of the reflection density.

[0091] In addition, the silicone in Table 1 is as follows, respectively.

- Emulsion mold silicone **: "SAG-30" by Nippon Unicar
- Emulsion mold silicone **: made in Dow Corning Asia "FS antiform DB-31"
- Self-emulsification mold silicone **: made in Dow Corning Asia "the FS antiform 80"
- Self-emulsification mold silicone **: made in Dow Corning Asia "FS antiform DK Q1-071"
- Self-emulsification mold silicone **: "KS-530" by the Shin-etsu chemistry company
- Self-emulsification mold silicone **: "KS-537" by the Shin-etsu chemistry company
- Self-emulsification mold silicone **: "KS-538" by the Shin-etsu chemistry company

[0092]

[Table 2]

表 2

	シリコン類		現像条件幅 (秒)
	種 類	添加量 (ppm)	
実施例 6	——	0	15
実施例 7	エマルジョン型シリコン①	100	25
実施例 8	エマルジョン型シリコン①	1000	50
実施例 9	エマルジョン型シリコン②	10	30
実施例10	エマルジョン型シリコン②	100	40
実施例11	自己乳化型シリコン①	10	25
実施例12	自己乳化型シリコン①	100	40
実施例13	自己乳化型シリコン②	100	40
実施例14	自己乳化型シリコン③	100	40
実施例15	自己乳化型シリコン④	10	25
実施例16	自己乳化型シリコン④	100	70
実施例17	自己乳化型シリコン⑤	10	25
実施例18	自己乳化型シリコン⑤	100	50

[0093]

[Effect of the Invention] While according to this invention excelling in the conte rest of the image section and the non-image section and also fully holding the remaining rate of membrane of the image section, the positive image formation approach excellent also in scratch-proof nature can be offered.

[Translation done.]